

battery. During the first phase of the 6.5A charging, a curve 20 of the graph indicates that the battery temperature may rise to 32°C until a transition to the second phase occurs, where the temperature may increase rapidly and approach 44°C. This two-phase temperature characteristic may be used to determine the effectiveness of the charge. According to one exemplary embodiment of the present invention, the second phase may be dampened to avoid a temperature increase above a predetermined level. This dampening ensures that the battery is not overheated, and extends the battery life and performance. In addition, to capitalize on the battery's low internal resistance during the start of the charge, it is possible to use higher intensity charging while temperature generation is low, thus dramatically decreasing the time needed to complete the charge of the battery.

[0023] Using a charging arrangement/platform and, a regulated charging using 1C and 2C charges can be performed (where C is a capacity rating). For example, if the battery manufacturer rates a NiMH D cell at 6500 mA capacity, the 1C charge is 6.5A constant current charge. As shown in a graph 40 of Figure 2, a 1C charge (illustrated as a curve 60) has generally a slow temperature elevation throughout the charge until close to charge termination. If the charge was to continue to be unregulated, the battery would likely reach a temperature of about 45°C at the end of the charge, which is above the recommended maximum temperature for the batteries used. If the charging is terminated at 40°C due to a temperature safety mechanism, as described above, the batteries would likely not be fully charged. A 2C charge (illustrated as a curve 65) also has a temperature elevation throughout the charge until near termination. Using this charge current, the temperature would likely increase to about 50°C if unregulated, which would result in damage to the battery.